

CLAIMS

IN THE CLAIMS:

1. A method of treating a surface of a substrate containing titanium, comprising the steps of:
removing surface adhesion substances from said surface, and
forming a transparent protective layer on said surface.
2. The method of claim 1 wherein said surface include surface adhesion substances which result from the substrate having been subjected to machine works.
3. The method of claim 1, wherein said transparent layer contains glass.
4. The method of claim 1, wherein the step of forming said transparent protective layer includes adhering a glass coating liquid on said surface from which surface adhesions substances have been removed, and drying said surface.
5. The method of claim 4, wherein said glass coating liquid is dried for about 1 to 20 minutes at a temperature in the range of about 20°C to 250°C.
6. The method of claim 4, including the steps of forming said glass coating liquid by diluting an original liquid with a diluting solvent.
7. The method of claim 1, wherein the step of removing surface adhesions substances includes chemical polishing said surface by immersing said surface in an etching solution.

8. The method of claim 7, wherein said etching solution comprises hydrofluoric acid, nitric acid and sulfuric acid.

9. The method of claim 8, wherein said etching solution is an aqueous solution comprising 1% to 10% volume of hydrofluoric acid, 15% to 40% volume of nitric acid and 30% to 60% volume of sulfuric acid.

10. The method of claim 7, wherein the temperature of said etching solution is in the range of about 30°C to 75°C.

11. The method of claim 7, wherein said surface is immersed in said etching solution for about 5 to 50 seconds.

12. The method of claim 1, wherein the step of removing surface adhesion substances includes electropolishing said surface with an electrolyte solution.

13. The method of claim 12, wherein said electrolyte solution contains phosphoric acid.

14. The method of claim 12, wherein said electropolishing procedure employs an anodic current density in the electrolyte solution of about 0.5 to 10 Amps/cm².

15. The method of claim 12, wherein said electropolishing step is performed for about 3 seconds to 2 minutes.

16. The method of claim 12, wherein the electrolyte solution contains H₃PO₄ in a concentration in the range of about 8% to 12%.

17. The method of claim 1, wherein said step of removing said first adhesion substances includes washing said surface.

18. The method of claim 1, wherein said surface adhesion substances contain titanium oxides that cause blackening of the surface.

19. The method of claim 2, wherein said machine works is selected from the group consisting of honing processing, nicking processing and mirror finishing.

20. The method of claim 6, wherein the step of forming said glass coating liquid includes selecting dilution ratios corresponding to selected machine works and diluting said original liquid to a dilution ratio corresponding to said machine works applied to said surface.

21. The method of claim 20, wherein said glass coating liquid has a viscosity of 150 cps (25°C) or greater and a dilution ratio in the range of about 30% to 70%.

22. The method of claim 20, wherein said glass coating liquid has a viscosity in the range of about 150 to 400 cps (25°C) and a dilution ratio in the range of about 50% to 98%.

23. The method of claim 4, wherein the step of drying said surface includes drying said surface at least two times under different drying conditions.

24. The method of claim 12, wherein the pH of the electrolyte solution is in the range of about 1.0 to 1.2.

25. An ornament, comprising a transparent protective layer formed over at least a portion of a surface of a metallic member containing titanium which is substantially free of surface adhesion substances.

26. The ornament of claim 25, wherein said transparent protective layer contains glass.

27. The ornament of claim 25, wherein said transparent protective layer has a thickness in the range of 0.2 to 15 microns.

28. The ornament of claim 25, wherein said transparent protective layer has a Vickers hardness in the range of 180 to 700.

29. The ornament of claim 25, wherein said ornament is a facing member for timepieces.

30. The ornament of claim 25, wherein said ornament decorates at least a portion of an electronic device.

31. The ornament of claim 30, wherein said electronic device is a timepiece.

32. An ornament comprising a transparent protective layer formed on a surface of a metallic member containing titanium which had been subjected to machine works and having substantially no surface adhesion substances thereon.

33. The ornament of claim 32, wherein said machine works is selected from the group consisting of honing processing, nicking processing and mirror finishing.

34. The ornament of claim 32, wherein said transparent layer contains glass.

35. The ornament of claim 32, wherein said transparent protector layer has a thickness in the range 0.2 to 15 microns.

36. The ornament of claim 32, wherein said transparent protector layer has a Vickers hardness in the range of 180 to 700.

37. The ornament of claim 32, wherein said ornament is a facing member for a timepieces.

38. The ornament of claim 32, wherein said ornament decorates at least a portion of an electronic device.

39. The ornament of claim 38, wherein said electronic device is a timepiece.